भारतीय मानक
Indian Standard

IS 17988 : 2022

क्लोरीनयुक्त पॉलीविनाइल क्लोराइड (सीपीवीसी) रेज़िन — विशिष्टि

Chlorinated Polyvinyl Chloride (CPVC) Resin— Specification

ICS 83.080.20, 83.140.30

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

October 2022 **Price Group 6**

Plastics Sectional Committee, PCD 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Chlorinated polyvinyl chloride (CPVC) is a thermoplastic produced by chlorinating polyvinyl chloride (PVC) resin. It is highly advanced than standard PVC compounds and can withstand much higher temperatures. CPVC possesses many of the same characteristics and properties as PVC, but there are a few important distinctions. Machining, welding, and forming are all possible readily workable with CPVC. CPVC is useful for self-supporting constructions where temperatures up to 95°C are present due to its exceptional corrosion resistance at elevated temperatures. Because CPVC can bend, shape, and weld, it may be used in a wide range of applications. Because of the higher chlorine content, CPVC compounds have high Limiting Oxygen Index (LOI) thereby contributing to a fire-retardant quality.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CHLORINATED POLYVINYL CHLORIDE (CPVC) RESIN— SPECIFICATION

1 SCOPE

This standard prescribes requirements, methods of sampling and tests for Chlorinated Polyvinyl Chloride (CPVC) resin.

2REFERENES

The standards and the other publications listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS/Other Publication	*Title*
IS 2828 : 2019/ISO 472 : 2013	Plastics — Vocabulary (*second revision*)
IS 4669 : 1968	Methods of test for polyvinyl chloride resins
IS 10151 : 2019	Polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water — Specification (*first revision*)
IS 13360 (Part 3/Sec 2) : 1997/ISO 60 : 1997	Plastics — Methods of testing: Part 3 Physical and dimensional properties, Section 2 Determination of apparent density of material that can be poured from a specified funnel
IS 15778 : 2007	Chlorinated polyvinyl chloride (CPVC) pipes for potable hot and cold-water distribution supplies — Specification
IS 17658 : 2021	Polyvinyl chloride homopolymer— Specification
ISO 1158 :1998	Plastics — Vinyl chloride homopolymers and copolymers — Determination of chlorine content
ISO 1265 : 2007	Plastics — Poly(vinyl chloride) resins — Determination of number of impurities and foreign particles
ISO 1269 : 2006	Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of volatile matter (including water)
ISO 1628-2 : 2020	Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 2: Poly(vinyl chloride) resins
ISO 4610 : 2001	Plastics — Vinyl chloride homopolymer and copolymer resins — Sieve analysis using air-jet sieve apparatus
ISO 6186 :1998	Plastics — Determination of pour ability
ISO 24538 : 2008	Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of residual vinyl chloride monomer by gas-chromatographic analysis of dry powder

3 TERMINOLOGY

3.1 For the purpose of this standard definition given in IS 2828 shall apply.

4 GRADES

The CPVC resin shall be of the following grades:

a) Grade 1;

b) Grade 2; and

c) Grade 3.

5 REQUIREMENTS

5.1 Basic Resin

CPVC resin is manufactured by chlorination of PVC Homopolymer conforming to IS 17658.

5.2 The CPVC material shall comply with the requirements given in Table 1.

Table 1 Requirements of CPVC Resin
(*Clause* 5.2)

Sl No.	**Characteristic**	**Requirements**			**Method of Test, Refer to IS/ISO**
		Grade 1	**Grade 2**	**Grade 3**	
(1)	(2)	(3)	(4)	(5)	(6)
i)	K Value for PVC resin, *Min*	56	66	66	IS 4669/ISO 1628-2
ii)	Inherent Viscosity, *Min*	0.61	0.8	0.8	ISO 1628-2
iii)	Sieve Analysis, material retained on 250-micron sieve, percent by weight, *Max*	5	5	5	IS 4669/ISO 4610
iv)	Average Particle Size, micron	100-200	100-200	100-200	IS 4669/ISO 4610
v)	Apparent density, g/ml	0.45 to 0.73	0.50 to 0.73	0.50 to 0.73	IS 4669/IS 13360 (Part 3/Sec 2)/ISO 60
vi)	Dry Flow of 140 g, sec, *Max*	25	25	25	Method A of ISO 6186
vii)	Volatile Matter, percent, *Max*	0.3	0.3	0.3	IS 4669/ISO 1269
viii)	Chlorine Content, percent, *Min*	66.5	66.5	64.5	IS 15778/ISO 1158
ix)	RVCM Content, ppm, *Max*	2	2	2	Annex A of IS 10151/ ISO 24538
x)	Foreign Matter, *Max*	20 number	20 number	20 number	ISO 1265

6 SPECIAL REQUIREMENTS OF POLYMER USED FOR MOULDING OR EXTRUSION ARTICLES IN CONTACT WITH FOOD STUFFS, PHARMACEUTICAL AND DRINKING WATER

When the products are used in contact with foodstuffs, pharmaceuticals and drinking water, its requirements with respect to the material shall also be met as per IS 10151.

7 PACKING AND MARKING

7.1 Packing

The material shall be packed in suitable form of packing or tankers or tank cars, as agreed between the purchaser and the supplier.

7.2 Marking

Each bag and/or unit package whichever is smallest in size that is being delivered to the customer shall be clearly marked with the following:

a) Name and grade of the material;
b) Net mass in the package;
c) Name of the manufacturer;
d) Country of Origin;
e) Recognized trademark; if any
f) Batch number/Lot number;
g) Month and year of manufacture of the material; and
h) Any other statutory requirements.

NOTE— Batch number/Lot number should reflect Month and Year of Manufacture of the material. If not, it has to be printed separately as mentioned in (g).

7.2.1 For supplies of material in tankers or tank cars, a test report containing the following information shall be provided for each tanker or tank car:

a) Name and type of the material;
b) Name of the manufacturer;
c) Country of Origin;

d) Batch number/Lot number;
e) Month and year of manufacture of the material;
f) Supply date;
g) Tanker number;
h) Quantity; and
j) Any other statutory requirements.

The test report shall be certified by authorized person of the manufacturer’s organization.

7.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

8 SAMPLING

The method of preparing representative test samples of the material and the criteria for conformity shall be as prescribed in Annex A.

ANNEX A

(*Clause 8*)

SAMPLING

A-1 GENERAL

In drawing, preparing, storing and handling samples, the precautions and directions given in **A-1.1** to **A-1.6** shall be observed.

A-1.1 Samples shall not be taken in an exposed place.

A-1.2 The sampling instrument shall be of stainless steel or any other suitable material on which the material shall have no action. The instrument shall be clean and dry.

A-1.3 Precautions shall be taken to protect the samples, the materials being sampled, the sampling instrument and the containers for samples from adventitious contamination.

A-1.4 The samples shall be placed in a suitable clean, dry, air-tight, Plastic/Metal/glass container on which the material has no action. The sample container shall be of such a size that it is almost completely filled by the sample.

A-1.5 Each sample container shall be sealed air-tight with a stopper, if appropriate, after filling and marked with full details of sampling such as the date of sampling, the month and year of manufacture of the material, etc.

A-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

A-2 SCALE OF SAMPLING

A-2.1 Lot/Batch

For continuous chemical processes like Polymer production, the sampling shall be done from sealed bags/packages or other representative sampling points after proper homogenization of the material.

To get the representative samples from the entire lot/batch, random sampling to be done from the entire lots/batches irrespective of the size of lot/batch. The number of sampling to be done as per below table based on the quantity of the lot/batch.

Lot Size (MT)	*Number of samples*
Up to 50	3
Above 50	4

Approximately 1 kg (or higher quantity required for testing) of sample is to be collected into a clean plastic bag, or other appropriate clean sealed container, to have 3 kg composite sample. Proper mixing to be done for homogenization of composite sample before testing.

Based on the requirement of testing, the portion of the composite sample will be stored properly in two containers as mentioned in clause **A-1.4**. Sample of the one container will be used for testing in front of inspection authority at manufacturer site/laboratory. The other sample container will be stored (Maximum 6 months) and properly labelled as Reference sample for the testing in future if it is required in case of any dispute or other requirement.

A-3 SAMPLING INSTRUMENT

A-3.1. The sampling instrument made of stainless steel shall be as shown in Fig. 1. It shall be capable of taking samples from all points when inserted into the container/bag. In case of FFS bag (Multilayer film Sack) sampling may be done by opening the bag and collecting the sample.

A-3.2 From each of the containers/bags selected, portions of the material shall be drawn with the help of the sampling instrument. The total quantity of the material collected from each container/bag shall be sufficient to conduct tests for the determination of the various characteristics as required.

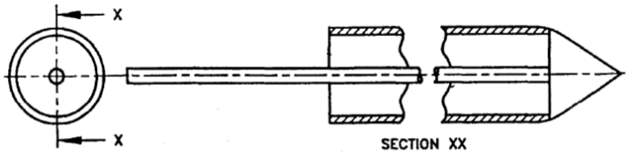

FIG. 1 SAMPLING INSTRUMENT

A-4 NUMBER OF TESTS

A-4.1 Tests for the Table 1 for CPVC resin shall be conducted individually from a portion of composite samples, kept in the bottle/container.

A-4.2 Tests other than Table 1 for CPVC resin shall be conducted on the remaining portion of composite samples, if it is required, as per agreement between buyer and seller.

A-5 CRITERIA FOR CONFORMITY

The lot shall be declared as conforming to the requirements of this specification if all the test results on individual samples meet the relevant Specification requirement.

ANNEX B
(*Foreword*)

COMMITTEE COMPOSITION

Plastics Sectional Committee, PCD 12

Organization	*Representative(s)*
Central Institute of Plastics Engineering and Technology (CIPET), Chennai	PROF (DR) SHISHIR SINHA (***chairperson***) DR S. N. YADAV DR SMITA MOHANTY (*Alternate*)
All India Plastics Manufacturers Association (AIPMA), New Delhi	SHRI DEEPAK BALLANI
Central Pollution Control Board, New Delhi	MS DIVYA SINHA SHRI C. K. DIXIT (*Alternate*)
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Coca-Cola India Private Limited, Gurugram	SHRI VIRENDRA LANDGE SHRI RAJENDRA DOBRIYAL (*Alternate*)
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IFCA, Mumbai	SHRI ATINDRA N. CHAUDHURI

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Indian Institute of Packaging (IIP), Mumbai	Shri Madhab Chakraborty Dr Tanweer Alam (*Alternate*)
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Plastindia Foundation, Mumbai	Dr E. Sundaresan Shri Hiten Bheda (*Alternate*)
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Scientist 'B' (PCD), BIS

Panel for Preparing Standard on Adhesive Film

Organization	*Representative(s)*
DCW Limited	Shri Sudarshan Ganapathy (***Convener***)
SABIC	Shri Nagaraj Dhadesugur
Lubrizol	Shri Sanjay Durrani
CPMA	Shri A. K. Ravi Kumar

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices: *Telephones*

Central : 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002 — 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091 — 2367 0012, 2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019 — 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113 — 2254 1442, 2254 1216

Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093 — 2821 8093

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